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(19) Japanese Patent Office (JP)

(12) Official Gazette for Unexamined Patents (A)

(11) Kokai Patent No. 2001-210005 (P2001-210005A)

(43) Early Disclosure Date: August 3, 2001)

(51) Int. Cl. <sup>7</sup> :	Identification Symbols:	FI:	Subject codes (Reference)
G11B 19/12	501	G11B 19/12	501Z 5D029
7/004		7/004	B 5D066
7/24	571	7/24	571A 5D090
19/06	501	19/06	501E

Request for Examination: Not Requested

Number of Claims: 3 OL (Total of 4 Pages)

(21) Application No. 2000-15124 (P2000-15124)

(33) Filing Date: January 24, 2000

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F terms (reference): 5D029 PA01 PA03  
5D066 GA02 GA07  
5D090 AA01 CC04 CC18 DD03 DD05  
HH03 HH08 LL08 LL09

(54) [Title of the Invention] Optical Disk Device

(57) [Abstract]

[Object] To confirm that there is label on the front surface of an optical disk without stopping the optical disk drive device.

[Means] In addition to the reproduction system of an optical disk drive device, the light-emitting system comprises position detection sensor 200 for detecting the position of the rotary shaft of spindle motor 106; circuit 201 of spindle motor 106 for forming single-rotation signal waveshape; strobe lighting circuit 203 connected to circuit 202 for detecting single-rotation signals; and light-emitting device 204

[illegible]

- |     |  |
|-----|--|
| 101 | Focus servo  |
| 102 | T racking servo                                      |
| 103 | Forward control                                      |
| 104 | Synchronization detector/demodulator                 |
| 105 | Spindle servo  |
| 106 | Spindle motor  |
| 109 | Laser diode  |
| 110 | Photodiode   |
| 112 | RF amplifier   |
| 201 | Circuit for forming single-rotation signal waveshape |
| 202 | Circuit for detecting single-rotation signal         |
| 203 | Strobe lighting circuit                              |

## **[Claims]**

**[Claim 1]** An optical disk device, characterized in that an optical disk drive device for reproducing signals wherein video and audio signals have been stored on an optical disk comprises a detection circuit for detecting the number of revolutions of the optical disk drive device and a light-emitting device for intermittently emitting light onto the front surface of the optical disk in accordance with the number of revolutions of the optical disk drive device detected by the detection circuit.

**[Claim 2]** The optical disk device according to claim 1, characterized in that the light-emitting device consists of a light guide plate and LED or a light guide plate and xenon lamp.

**[Claim 3]** The optical disk device according to claim 1 or 2, characterized in that an optical disk is used wherein a picture, characters or an abbreviation representing the characteristics of the stored signals is displayed on the front surface of the optical disk.

## **[Detailed Description of the Invention]**

**[0001]**

**[Industrial Field of Invention]** The present invention relates to an optical disk drive device for a DVD, LD, MD, CD, MO or other disk on which AV (audio-video) digital signals are recorded, and in particular, pertains to an optical disk device for intermittent emission of light during operation in order to identify the label on the front surface of an optical disk on which a picture, characters or an abbreviation representing the characteristics of the stored digital signals is displayed.

**[0002]**

## **[Prior Art]**

When using an optical disk drive device for a DVD, LD, MD, CD, MO or other optical disk on which AV (audio-video) digital signals have been recorded, it is often difficult to identify the label on the front surface of the of the optical disk on which a picture, text, or an abbreviation representing the characteristics of the recorded digital signals is displayed.

**[0003]**

**[Problems to be solved by the invention]** Nevertheless, the label on the front surface of the optical disk displaying a picture, characters, or an abbreviation that represents the characteristics of the recorded digital signals cannot be identified by conventional methods when the optical disk is turning. It is very inconvenient if the label cannot somehow be identified because it becomes necessary to temporarily stop the optical disk drive device (simply device hereafter), remove the optical disk from the device, and check the label. An object of the present invention is to eliminate this disadvantage and make it possible to identify the label on the front surface of an optical disk on which a picture, characters or an abbreviation representing the characteristics of the recorded digital signals is displayed, even when the optical disk is turning.

**[0004]**

**[Means for solving problems]** The optical disk device of claim 1 of the present invention intended to accomplish the object is characterized in that an optical disk drive device for reproducing signals wherein video and audio signals have been stored on an optical disk comprises a detection circuit for detecting the number of revolutions of the optical disk drive device and a light-emitting device for intermittently emitting light onto the front surface of the optical disk in accordance with the number of revolutions of the optical disk drive device detected by the detection circuit.

**[0005]** The optical disk device of claim 2 of the present invention intended to accomplish the object is characterized in that the light-emitting device consists of a light guide plate and LED or a light guide plate and xenon lamp.

**[0006]** The optical disk drive of claim 3 of the present invention intended to accomplish the object is characterized in that an optical disk is used wherein a picture, characters or an abbreviation representing the characteristics of the stored signals is displayed on the front surface of the optical disk.

**[0007]**

**[Embodiments of the Invention]** Embodiments of the present invention will be described while referring to the drawings. Figure 1 (front half of Figure 1 is shown in Figure 1(A), back half of Figure 1 is shown in Figure 1(B)) is a system drawing using a CD as an example of the present invention. Circuit block diagram

150 enclosed by the broken lines in Figure 1 shows the reproduction system for signals digitally recorded on a conventional CD. When operating key 132 connected to system control 131 is operated, AV reproduction is displayed on display 133; operating signals are read by subcode reader 113, which for instance shows the curve peak; spindle servo motor 105 is turned on by synchronization detector/demodulator 104; and spindle motor 106 on which disk 107 is mounted turns. In the case of a CD, the number of revolutions of spindle motor 106 generally changes up to 500 rpm on the inside periphery and up to 200 rpm on the outside periphery under CLV (constant linear velocity). By means of phase lock loop (PLL) 100 from subcode reader 113, forward control 103 slides focus servo 101, tracking servo 102, and the optical pickup that are connected to RF amplifier 112; optical pick up motor 108 is forward aligned; laser light from laser diode 109 is radiated onto disk 107 through objective lens 111 mounted on the optical pickup device; and the returning light is received at photodiode 110 and locked through RF amplifier 112. The reproduced signals from photodiode 110 pass through RF amplifier 112; synchronization detector/demodulator 104, 1.6k error correction deinterleave 121 connected to 1.6 k memory RAM 120; control RAM 122; DA converter 123; LR separator 124; sample holds 125 and 126 in two rows connected to LR separator 124; low pass filters 127 and 128; and amplifiers 129 and 130 to obtain R channel output signal 135 and L channel output signal 134.

[0008] The system for emitting light onto a disk of the present invention is used with this circuit block drawing 150 and comprises position detection sensor 200 for detecting the position of the rotary shaft of spindle motor 106; circuit 201 of spindle motor 106 for forming single-rotation signal waveshape; strobe lighting circuit 203 connected to circuit 202 for detecting single-rotation signals, and light-emitting device 204 that consists of a light guide plate (not illustrated) and LED or a light guide plate (not illustrated) and xenon lamp and is connected to strobe lighting circuit 203.

[0009] When light from light-emitting device 204 is radiated onto the front surface of disk 107 intermittently and in synchronization with the number of revolutions of spindle motor 106, the label affixed to the front surface of the disk, that is, the picture, abbreviation, photograph, and the like, can be seen

without stopping the optical disk drive device. As a result, the procedure of re-operating key 132 can be omitted.

[0010] The structure of the present invention is appropriate for disks other than CLV disks (constant linear speed), such as CAV (constant angular velocity) disks, and can be used on a wide variety of optical disks, including not only CDs, but also DVDs, LDs, MDs, MOs, and the like.

[0011] **[Effect of the Invention]** By means of the present invention, it is possible to identify the label, that is, picture, abbreviation, photo, and the like, affixed to the front surface of disk 107 without stopping or correcting operation of optical disk drive device.

[0012] Moreover, the same structure of the present invention can be used for a wide variety of optical disks including not only CDs, but also DVDs, LDs, MD, MOs, and the like.

[0013] In addition, the present invention is a simple structure and has excellent cost performance. Therefore, the effect in terms of practical use is considerable.

#### **[Brief Description of the Drawings]**

**[Figure 1(A)]** Figure 1 is a system drawing using a CD as an example of the present invention, and Figure 1(A) is the front half of Figure 1.

**[Figure 1(B)]** Figure 1(B) is the back half of Figure 1.

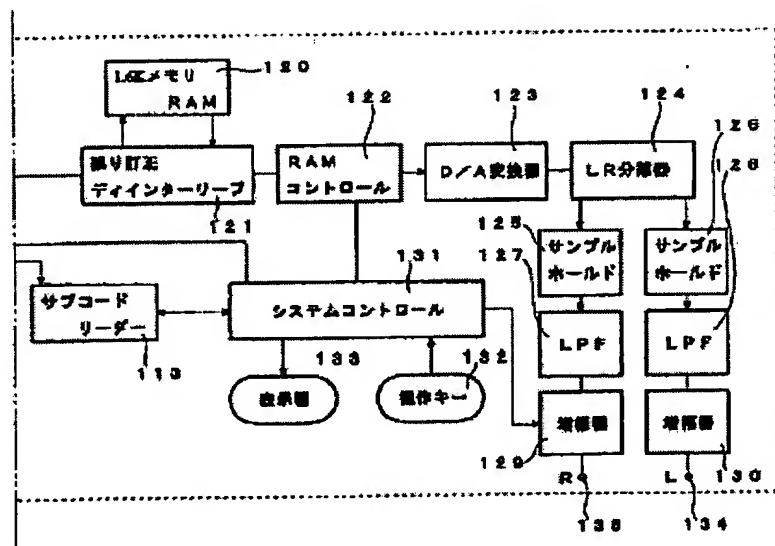
#### **[Key]**

- 200 Position detection sensor
- 201 Circuit for forming single-turn signal waveshape
- 202 Circuit for detecting single-turn signal
- 203 Strobe lighting circuit
- 204 Light emitting device

[illegible]

- |     |  |
|-----|--|
| 101 | Focus servo  |
| 102 | T racking servo                                      |
| 103 | Forward control                                      |
| 104 | Synchronization detector/demodulator                 |
| 105 | Spindle servo  |
| 106 | Spindle motor  |
| 109 | Laser diode  |
| 110 | Photodiode   |
| 112 | RF amplifier   |
| 201 | Circuit for forming single-rotation signal waveshape |
| 202 | Circuit for detecting single-rotation signal         |
| 203 | Strobe lighting circuit                              |

[Figure 1(B)]



113 Subcode reader

120.6 K memory RAM

121 Error correction deinterleave

122 RAM control

123 D/A converter

124 LR separator

125 Sample hold

126 Sample hold

129 Amplifier

130 Amplifier

131 System control

132 Operating key

133 Display device